Sempervirens
Summer 2015 | The Quarterly of the Virginia Native Plant Society

Annual Meeting to Showcase Shenandoah Valley

By Mark Gatewood, Shenandoah Chapter

The Virginia Native Plant Society Annual Meeting returns to the Shenandoah Valley this year, cosponsored by the Upper James River and Shenandoah Valley chapters. Dates are September 11, 12, and 13. The Shenandoah Valley has a remarkable variety of landscapes and habitats. Virginia's storied James and Shenandoah rivers originate in the Valley. The landscape is a mosaic of public lands in the Blue Ridge and Allegheny mountains, with a strong agricultural presence on the rolling hills of the Valley floor. Topography and running waters have created a variety of habitats for your exploration.

To aid you in experiencing and understanding this remarkable landscape, the Annual Meeting Committee has planned 7 full-day and 10 half-day field trips. A description of each field trip may be found later in this issue and includes details on destination, featured plants and habitats, duration, walking difficulty, and group size limits to allow you to plan your time.

When not in the wilds, attendees will enjoy learning more about the Valley's special places with three fascinating speakers, two on Friday and one delivering the keynote address at Saturday's banquet. On Friday evening, Lynn Cameron will describe her work in bringing together a coalition of interested parties to seek special national scenic area designation for Shenandoah Mountain in the George Washington National Forest. Then, *Sempervirens* Editor Nancy Sorrells will speak on the threats to some of our cherished natural areas by a proposed natural-gas pipeline route. Saturday night's speaker will be Bobby Whitescarver, a retired soil conservationist with the Natural Resource Conservation Service, a dynamic speaker and a natural resource in his own right.

Annual meeting headquarters will be the Frontier Culture Museum in Staunton. We will be in the Dairy Barn Friday night for early registration, a buffet dinner, our two speakers, and the state board meeting. All field trips (Saturday and Sunday) will convene at the Cochran Pavilion, where Saturday's dinner and featured presentation will likewise be held. ❖

Towering hemlocks that have been successfully treated for woolly adelgid are among the sights to be seen on the Hone Quarry field trip to the George Washington National Forest on Saturday during the Annual Meeting. (Photograph by Nancy Sorrells)

Sept. 11–13

DETAILS AND REGISTRATION INFO START ON PAGE 5!

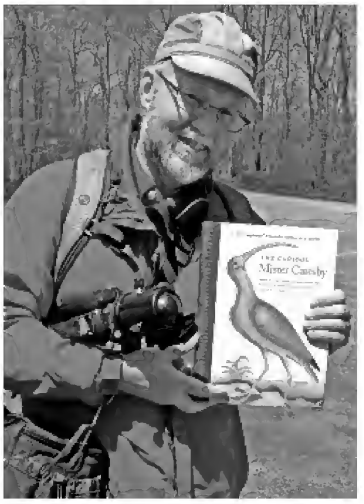
From the President

G. Richard Thompson WMA an Enchanting Place

Not once, not twice, but three times did I visit the G. Richard Thompson Wildlife Management Area in just two and a half weeks this spring—and I wish I had made the time to go even more. A VNPS Registry Site, it is a magical place for spectacular wildflowers and birds in the spring. For my first foray, I tagged along with the Piedmont Chapter on April 24 for a walk led by Gary Fleming, a vegetation ecologist with the Virginia Natural Heritage Program. As we gathered, Jocelyn Sladen presented Gary with a book, *The Curious Mister Catesby*, to commemorate a special hike 25 years earlier. That long-ago hike led to a memorandum of understanding with the Virginia Department of Game and Inland Fisheries, which manages the site. That group included Bob Duncan, now VGIF director, who was impressed by the stands of glorious White Trillium (*Trillium grandiflorum*). The MOU outlined the protection of this incredible area and created our first Registry Site, a designation conferred upon special areas worthy of recognition and conservation. While Thompson is renowned for those trilliums, our visit was too early for their peak bloom. But Gary showed us that Thompson is more than just trilliums.

First he led us down a service road lined with huge Bloodroots (*Sanguinaria canadensis*), Dutchman's Breeches (*Dicentra cucullaria*), and hillsides of Yellow Trout Lilies (*Erythronium americanum*). For part two, we were promised something very different, and it involved some bushwhacking. Gary used a GPS to navigate to a large, captivating seep. Here we encountered enormous Skunk Cabbages (*Symplocarpus foetidus*), American False-hellebores (*Veratrum viride)*, Marsh Marigolds (*Caltha palustris*), Wood Anemones (*Anemone quinquefolia*), and a multitude of ferns. What a treat! And well worth the challenge of crossing fallen trees and wet areas to reach it.

My second visit was on May 5, traditionally about the peak time for the trilliums, and this trip included birding friends. While Northern Virginia traffic that morning put me in a bad mood, my spirits lifted once we entered this land of enchantment, Thompson. American Redstarts, Scarlet Tanagers, Eastern Towhees, and Hooded Warblers sang from the trees. Farther along we heard Ovenbirds and the flutelike song of the Wood Thrush, my favorite sound in nature. The trilliums were in their glory, and the occasional brilliant pink one joined its crisp white sisters. Magnificent Mayapples (*Podophyllum peltatum*) spread their leaves like umbrellas sheltering the white flowers, and yellow and blue violets added color. I had hoped to find Showy Orchis (*Galearis spectabilis*) and Yellow Lady's-slipper (*Cypripedium parviflorum*), but the Lady's-slippers we saw were just beginning to show color, and we missed the Showy Orchis. Regardless, this visit was a delight, and our friends were suitably impressed.



Heritage ecologist Gary Fleming

On May 12 I had VNPS business at the Blandy office. Afterward I took a solitary walk along the beautiful native plant trail there, but then Thompson called. "You need to see the Yellow Lady's-slippers and find some Showy Orchis!" I took a scenic route through the Piedmont to Thompson. Wild geraniums (*Geranium maculatum*) lined the ditches as the road led uphill. I went directly to the patch where we had spotted the Yellow Lady's-slippers and was rewarded with gorgeous specimens in peak bloom. Yes, I would seek out Showy Orchis on the Appalachian Trail. That narrow path places the hiker in a floriferous wonderland. Sure enough, I found Showy Orchis, and it was stunning. The day was very warm, but I felt light and happy. Spring ends way too soon, but Gary asserted that Thompson has all-season interest. A summer visit beckons.

Virginia has many magical places, and some are natural area preserves under the purview of the Natural Heritage Program. Others are part of our national or state parks and forests. All need our support and protection. Our annual meeting in September offers the opportunity to visit some of the special areas in the Staunton region. Please make plans to join us there. ***—Your President, Nancy Vehrs***

Diversity, Beauty of Great Smoky Mountains Amaze Society Visitors

They never cease to amaze, these mountains. This spring I joined Butch and Betty Kelly and Sally Anderson on another superbly planned VNPS trip to the Great Smokies. Some two dozen of us from all over Virginia made the trek down to the Music Road Inn in Pigeon Forge, Tenn., for five days of botanizing in the heart of the biome of southern Appalachia. Each morning we shed the kitsch of Pigeon Forge to drive into one of the most frequently visited parks in the United States.

Our first morning out, we hiked briefly up the trail to the fabled Ramsey Cascades, a destination I'm saving for another trip, before we redirected our hiking up Porters Creek Trail. The hiking was easy up an old roadbed, and we inevitably spread out. We saw the first of the trilliums that would delight us in the park, the Sweet White Trillium (*Trillium simile*) with its purple eye and the Yellow Trillium (*Trillium luteum*) with its darkly mottled leaf. Showy Orchis (*Galearis spectabilis*) lived up to its name, and I was wowed by the glossy evergreen abundance of Highland Dog-hobble (*Leucothoe fontanesiana*) in bloom and determined to plant some on a hillside around my home that is giving me fits.

We summoned our courage for a hairy stream crossing on a slick split-rail bridge—Porters Creek was a virtual cataract from all the rainfall—but we made it across to emerge into a sweep of Fringed Phacelia (*Phacelia fimbriata*) as far as the eye could see. It was glorious. We hiked quickly up to Fern Branch Falls, where we ate our lunch before returning.

Day Two began with a hike around the Sugarlands Visitor Center before heading up Newfound Gap Road to Chimney Tops, where we ate our box lunches and then hiked. Blue Cohosh (*Caulophyllum thalictroides*) and Common Black Cohosh (*Actaea racemosa*) were growing side by side. Same name, but I was finally able to see and remember the obvious differences. We finished the afternoon with a walk around the Noah "Bud" Ogle self-guiding nature trail close to town. We saw the remnants of a mill and a beautifully preserved settler's cabin. Fernleaf Phacelia (*Phacelia bipinnatifida*) surprised us spilling down a hillside by the parking lot.

Did I mention the weather? It had been pretty much gray with light drizzle, but by Wednesday it was raining hard, so we decided to drive to Cades Cove. On the drive in, Sally had spotted a Catesby's Trillium (*Trillium catesbaei*), so we stopped to look on the way out and found several dozen more. It is always such a puzzle to me where a plant flourishes. This was at the corner of an intersection with a gravel road. On the return trip, we dodged traffic to look for plants growing out of the cliffs along Little River Road—Wild Bleeding Heart (*Dicentra eximia*) and exquisite Wild Columbine (*Aquilegia canadensis*).

Thursday we drove through fog up Newfound Gap Road and over the Eastern Continental Divide to reach Kanati Fork Trail. There we were greeted with wonderful Painted Trilliums (*Trillium undulatum*). Another beauty was Yellow Mandarin or Yellow Fairybells (*Prosartes lanuginosa*). We drove back up to the top and hiked a steep half mile to the top of Clingmans Dome, the highest point in the park, still in fog. Then, of course, we congratulated ourselves.

Negotiating a perilous bridge over Porters Creek. (Photograph by Sheryl Pollock)

The icing on the cake was a short walk on Spruce–Fir Trail on a boardwalk through a damp, fragrant forest of Fraser Fir (*Abies fraseri*) and Red Spruce (*Picea rubens*).

On our last day we were joined by old friends Wes and Rochelle Siegrist, miniaturist artists whom we had met two years earlier and who live close to the park. Right off, we saw Cancer-root (*Orobanche uniflora*) before crossing the road to hike up Chestnut Top Trail. If you have only one day to hike in the park, this is the trail to choose. The diversity is overwhelming. Maidenhair Fern (*Adiantum pedatum*) intertwines with Solomon's-seal (*Polygonatum biflorum* var. biflorum) to carpet the hillsides. Look up and you see Sweetgum (*Liquidambar styraciflua*) and Basswood (*Tilia americana*), blooming Yellow Buckeye (*Aesculus flava*) and Cucumber-tree (*Magnolia acuminata*), Winged Elm (*Ulmus alata*), and that signature of the Smokies, the Common Silverbell (*Halesia tetraptera*). Springtime in the Smokies is sweet indeed.

—Marjorie Prochaska, First Vice President

Managing Natural Areas Requires Perpetual Work

From Your Natural Heritage Program

By Tom Smith

In the past two issues I discussed how the Virginia Natural Heritage Program determines what native plants are rare and included as natural heritage resources and how properties are selected to become part of your state Natural Area Preserve System. Since 1990, that system has grown from 0 to 62 state natural area preserves, protecting 760 natural communities and rare species populations. As is sometimes said, when the property is purchased, the real work begins, forever. So, a short discussion on what it means to manage a preserve will be the subject of this note.

The Virginia Natural Area Preserves Act was well crafted by conservation leaders, including Robert Jenkins, former director of science for The Nature Conservancy; George Fenwick, former TNC state director and now president of the American Bird Conservancy; Michael Lipford, former Natural Heritage Program director and now the TNC Virginia executive director; and Leon App, former deputy director of the Virginia Department of Conservation and Recreation, of which Natural Heritage is a division. The act states that the first priority for management of natural area preserves is protection of the natural heritage resources on the property; the second consideration is public access when resources can support it.

The Natural Area Preserve System is divided into seven regions, each with a regional steward possessing a background in ecology/natural resource management, and five operations stewards (some cover multiple regions) are responsible for parking areas, trails, boundaries, visitor issues, and biological management as time allows. It is the natural heritage resources and their ranks, derived using standard NatureServe methodology, that are the basis of our stewardship efforts, with the rarest species and communities garnering priority attention. A few natural areas require only minimal management, such as an old-growth forest that is free of invasive species and doing just fine. Most require regular invasive-species monitoring and control; 22 are under prescribed fire management or need to be; glades, migratory songbird habitat, and Longleaf Pine are among the restoration projects; and all require rare species monitoring—expensive and time-consuming tasks. We'll look at such tasks in future notes.

> *Once dedicated, a natural area preserve shall be managed in a manner consistent with continued preservation of the natural heritage resources it supports.* Code of Virginia §10.1–214.

Of the system's 62 preserves, 21 have a 5- to 10-car gravel parking area, self-guided hiking trails with signage, boardwalks, and observation decks. Once a site has a parking area and trail, expenditures of staff time and funds increase significantly for maintenance, dealing with impacts such as invasive species that may come in on boots (please clean your boots!), and repairing harm to sensitive resources by off-trail hiking and overuse.

In December 2014 the Board of Conservation and Recreation (which serves in an advisory capacity to the DCR director) endorsed a Natural Heritage budget rebenchmark of more than $2.9 million and 26 full-time employees. As you learned in the Spring 2015 *Sempervirens* from President Vehrs, and thanks in large part to the VNPS effort, the General Assembly and Governor McAuliffe approved a $500,000 budget increase toward that $2.9 million rebenchmark, which would now stand at $2.4 million, to help address the greatly expanded scope and depth of responsibilities. ❖

Tom Smith is director of the Virginia Natural Heritage Program. Learn more about our natural area preserves at www.dcr.virginia.gov/natural_heritage/index.shtml.

VIRGINIA NATIVE PLANT SOCIETY

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Original material in *Sempervirens* may be reprinted if credit is given to the Virginia Native Plant Society, to *Sempervirens*, and to the author of the material, if named. Readers are invited to send letters, news items, and queries for consideration. E-mail items to Nancy Sorrells at lotswife@comcast.net.

Next submission deadline: August 1, 2015

ANNUAL MEETING 2015

Rescue, Reclaim, Restore

CHALLENGES FOR NATIVE HABITATS IN VIRGINIA'S GREAT VALLEY

Virginia Native Plant Society Annual Meeting
September 11–13, 2015
Frontier Culture Museum, Staunton, Va.

Hosted by the Shenandoah and Upper James River Chapters

Schedule

FRIDAY, SEPTEMBER 11
FRONTIER CULTURE MUSEUM DAIRY BARN

3–5 p.m.	State Board meeting
5–6 p.m.	Registration and social hour. Cash bar
6–7 p.m.	Buffet dinner
7:30–8 p.m.	*Lynn Cameron:* Shenandoah Mountain: A Proposal to Protect our Wild Heritage
8–8:30 p.m.	*Nancy Sorrells:* Effects of the Proposed Atlantic Coast Pipeline on Native Habitat

SATURDAY, SEPTEMBER 12
FRONTIER CULTURE MUSEUM PAVILION

7:30–9 a.m.	Registration and field trip group organization
9–4:30 p.m.	Field trips
5–6:30 p.m.	Social hour. Cash bar. Music by Highlanders String Band
6:30–7:30 p.m.	Buffet dinner
7:30–8:30 p.m.	Annual business meeting, President Nancy Vehrs
8:30–9:30 p.m.	*Bobby Whitescarver:* Native Communities in a Sea of Invasives: The Stories

SUNDAY, SEPTEMBER 13
FRONTIER CULTURE MUSEUM PAVILION

8:30–9:30 a.m.	Field trip group organization
9 a.m.	Field trips leave

Accommodations

Reserved rooms for VNPS: Best Western Staunton Inn, 90 Rowe Road, just off of U.S. 250 East at the I-81 Exit for Staunton and Waynesboro (a half mile from the entrance to the Frontier Culture Museum). The special Annual Meeting rate applies only for Friday, Sept. 11, and Saturday, Sept. 12. The rate is $93 (tax included) per room per night. Reserve by August 29; the hotel has set aside 32 nonsmoking rooms with two double beds and three nonsmoking rooms with one king bed. For reservations, call 1-800-752-9471 and mention the Virginia Native Plant Society. There are several other hotels nearby. Your registration packet will include information about local points of interest and restaurants.

Directions

I-81 Exit 222. Head west on U.S. 250. The Frontier Culture Museum is a half mile on the left. Proceed to the visitor parking lot. On Saturday and Sunday, park in the visitor parking lot. Walk down the main sidewalk to the Pavilion on your left. On Friday, continue through the parking lot and turn to the left of the flagpoles. Follow the sign to the Dairy Barn parking area.

FIELD TRIPS

Saturday, September 12

FULL-DAY TRIPS, DEPART 9 A.M., RETURN BY 4:30 P.M.

1. ___ Hone Quarry–Reddish Knob Duo Take an auto tour of the proposed 90,000-acre Shenandoah Mountain National Scenic Area and go on two short hikes for a total of 3 mi. We will go to Hone Quarry Recreation Area and hike Cliff Trail to a scenic view (about 1 mi. round-trip. Moderate, but steep and rocky.) Then we will drive a narrow, winding forest road to Reddish Knob, the highest point (4,397 ft.) in the national scenic area offering a panoramic view of the Shenandoah Valley and West Virginia. We'll finish by driving to the old Shenandoah Mountain Picnic Area and hiking to the North River headwaters spring (about a 1.5-mi. hike round-trip. Easy.) Leader, Lynn Cameron. Group limit, 10.

2. ___ Rockbridge County Explore three habitats in the James River watershed. Stop 1: Brushy Hills. Moderate. Originally protected as a source for Lexington's water, Brushy Hills' 560 acres are being reclaimed for recreation and education. We will check management sites as we explore for September blooms and seed pods. 2 hours. Stop 2: Boxerwood Nature Center and Woodland Garden. Easy. Once a plant collector's private garden, Boxerwood is evolving to nonprofit status as a public nature center, providing environmental education for all ages. 2 hours. Stop 3: Chessie Trail. As a riverine habitat along the Maury River, the trail has been a canal boat towpath and a railroad bed. We will see protection methods for identified native plant areas and invasive nonnative plant management as we explore a path framed by the geology of a mountain river gorge. 2 hours. Group limit, 15.

3. ___ Maple Flats (sinkhole ponds in the George Washington National Forest). We will visit six to eight sinkhole ponds in the Maple Flats pond complex, including some of the largest and most significant in terms of rare species. Estimated total walking distance is around 4 mi., all on very moderate to level terrain. Some off-trail hiking will be necessary to reach all the ponds. Assuming the ponds will have drawn down enough, we should see many globally and state rare plants, including the narrow endemics *Helenium virginicum* and *Boltonia montana,* and several of the endemic natural community types of these Shenandoah Valley ponds. Leader, Gary Fleming, ecologist with the Virginia Natural Heritage Program. Group limit, 12.

4. ___ Geology and Plants East Driving tour with many stops and short walks along the Blue Ridge Mountains and eastern edge of the Shenandoah Valley. We will look for geologic variation and its effect on forest and wildflowers as topography changes. The tour will make a big loop, going up the Sherando Road to Love, then north on the Blue Ridge Parkway to Afton, continuing north into Shenandoah National Park ($20 per car required) on the Skyline Drive to Rt. 33, and then back to Staunton. Leader, Tom Dierauf. Group limit, 12.

5. ___ Sister Knob Shale Barren in Highland County. A 3-mi. walk up a gradual grade starting at Scotch Town draft up to South Sister Knob ending at Head Waters in Highland County. The focus will be shale barren natives. Car shuttle is needed. One-hour drive from Staunton. Leader, Jay Shaner. Group limit, 12.

6. ___ Cowbane Prairie and Mount Joy Natural Heritage sites We will visit Cowbane Prairie in Stuarts Draft along the South River in the morning. (3-mi. round trip; flat walking but could be soggy; boots recommended.) Cowbane is an excellent example of a wetland community once common throughout the Valley. Many native grasses and plants including Queen-of-the-Prairie (*Filipendula rubra*) not in bloom will be seen. Efforts to restore the area will be discussed. Lunch at Mount Joy in southeastern Augusta County will be followed by a 2-mi. tour of a sinkhole pond containing globally rare Virginia Sneezeweed (*Helenium virginicum*) possibly still in bloom. Learn why sinkhole ponds are different from vernal ponds. Leader, Adam Christie, Virginia Natural Heritage Program steward. Group limit, 12.

7. ___ American Chestnut Foundation trip to Lesesne State Forest in Nelson County. Learn to identify American, Chinese, European, and Japanese chestnuts and Chinquapins. The foundation's breeding program will be described. If time permits, visit a site off the Blue Ridge Parkway to harvest Chinese and American or backcross (hybrid) nuts. Leader, Jack LaMonica. Group limit, 12.

Saturday, September 12, Morning

HALF-DAY TRIPS; DEPART 9 A.M., RETURN BY NOON

8. ___ Lewis Creek and Poague Run Watershed Restoration The riparian areas of two watersheds within the Staunton city limits were highly degraded by farming practices. Native tree plantings in 1998 changed all that. Today Osprey nest in the area, and Brook Trout are due to be introduced. Learn about the challenges and see the results by walking 1.5 mi. through the riparian buffer.

Leader, Bobby Whitescarver. Group limit, 12. (This half-day trip pairs well with trip 10.)

9. ___ Historical tour of Staunton and Lewis Creek watershed Hilly; walk about 1.5 mi. on downtown sidewalks with steps and hills to explore Staunton's Lewis Creek and follow the water's flow while listening to related stories. Topics: A little map study for orientation; Karst topography and local geology; Lewis Creek's historic importance and its "disappearance/reappearance" in Staunton; how the creek became an "impaired waterway"; and Staunton's municipal projects for improving the water quality of the creek. Leader, Betty Gatewood. Group limit, 12.

Saturday, September 12, Afternoon

HALF-DAY TRIPS; DEPART 1 P.M., RETURN BY 4:30 P.M.

10. __ Augusta Forestry Center Visit a 100-acre tree nursery in Crimora. This state-run facility grows almost 40 varieties of native hardwoods and softwoods that are used statewide in restoration and conservation projects. Compare the natural method with the human method of growing trees. Group limit, 15. (This half-day trip pairs well with trip 8.)

11. __ Tilghman Road in the George Washington National Forest Asters and Monkshood (*Aconitum uncinatum*) are among the many visual possibilities on this stretch of Forest Service road. We will be looking for birds and mushrooms as well. Leader, Diane Holsinger. Group limit, 12.

12. __ Augusta Springs Wetlands After a 25-min. drive west from Staunton, take the handicapped-accessible 2/3-mile boardwalk loop around the wetland and explore the natural history of this special area. It is home to Wood Ducks, Beaver, Pickerel Frogs, Tiger and Spicebush Swallowtail butterflies, and Green Herons. It was the site of a hotel and resort springs from the late 1800s, now long gone. Picnic tables are available under the shade of maples more than 100 years old. Many wetland natives, and an excellent birding spot. Leader, Mike Smith. Group limit, 15.

Sunday, September 13, Morning

HALF-DAY TRIPS; DEPART 9 A.M.

13. __ Geology and Plants West We will drive first to the Confederate Breastworks Overlook at the top of Shenandoah Mountain and enjoy a panoramic view of the surrounding Allegheny Mountain ridges in Highland and Augusta counties. After a discussion of the regional geologic setting, we will drive back east to the bottom of the mountain for our hike along Ramsey's Draft Trail from the Mountain House trailhead off of U.S. 250, past sedimentary rock outcrops along the stream. This is an easy hike, about 1 mi. round-trip, on an easy grade. This is one the first wilderness areas established in the George Washington National Forest. Leader, Malcom Cameron. Group limit, 10.

14. __ Grand Caverns (above ground!), Grottoes A 2.5-mi. loop. Flat walking on the South River, then an optional 200-ft. vertical climb to the top of Cave Hill for excellent views of the South River and Blue Ridge Mountains. Pass the entrance to Fountain Cave (closed). Learn about the riparian vegetation, geology, limestone ferns, and the historical connection to William Alphonso Murrill, who identified and named the organism causing chestnut blight and wrote *The Natural History of Staunton*. No fee to enter park. Leader, Mark Gatewood. Group limit, 20. After the walk, visit **Grand Caverns (below ground!)** for a 70-minute tour. (Fees: $18 regular, $16 senior, $13 each for group of 12). Excellent cave formations. www.grandcaverns.com.

15. __ Chessie Trail in Lexington. As a riverine habitat along the Maury River, the trail has been a canal boat towpath and a railroad bed. In more recent times it has provided an informal place to hike or bike from Lexington to Buena Vista. Virginia Military Institute, Friends of the Chessie Trail, and volunteers with Master Naturalists and VNPS are working together to rescue this community resource. See protection methods for identified native plant areas and invasive nonnative plant management as we explore a path framed by the geology of a mountain river gorge. 2 hours. Group limit, 15.

16. __ Edith J. Carrier Arboretum, James Madison University, Harrisonburg The arboretum provides a combination of botanical gardens set in a mid-Appalachian forest. This setting allows for research, teaching botany students, and public outreach. Group limit, 15.

17. __ Madison Run Moderate walk on a Shenandoah National Park fire road along Madison Run. Enter the park from the valley floor (no fee). Flora changes noticeably with elevation. A good, easily accessible place to see many native plants. 2–4 mi., depending on the group. Group limit, 15.

REGISTRATION FORM

Rescue, Reclaim, Restore

CHALLENGES FOR NATIVE HABITATS IN VIRGINIA'S GREAT VALLEY

Virginia Native Plant Society Annual Meeting
September 11–13, 2015, Frontier Culture Museum, Staunton

Name _____ Phone _____

Second person in party_____ Cell Phone_____

Mailing address _____

E-mail address (print carefully) _____

Signatures: 1st person _____(required)

2nd person_____(required)

Registration fee is $99 per VNPS member. This includes dinners and speakers on Friday and Saturday nights and field trips Friday, Saturday, and Sunday. Some trips have additional fees. Registration closes Friday, Sept. 4. **Signatures** *are required on all registrations. By signing this, the above registrant(s) shall hold harmless the Virginia Native Plant Society, including its staff, volunteers, and those designated to serve as their provider.* **The Frontier Culture Museum** *is a living history museum that tells the story of what life was like as the Valley changed with waves of immigrants. Admission to the Frontier Culture Museum is not covered by your registration fee for the Annual Meeting. Visit www.frontiermuseum.org for more information.*

Calculate your costs

Registration per VNPS member (or family)	$99 × number of attendees: _____= $_____	**Total:**
per non-VNPS member	$130 × number of attendees: _____= $_____	
Saturday box lunch (optional)	$13 × number of attendees: _____= $_____	$_____
Friday program/dinner only	$38 × number of attendees: _____= $_____	
Saturday program/dinner only	$38 × number of attendees: _____= $_____	

Lunches For the Sunday field trips you will need to provide your own lunch. For the full-day Saturday field trips you may order a box lunch or bring your own. For half-day field trips you may order a box lunch or visit a restaurant.

For optional Saturday box lunch ($13 extra) indicate your preference:

Smoked Turkey___ Black Forest Ham___ Vegetables with Hummus___

Please note any food allergies or dietary restrictions:_____

Field trip selections List trip numbers, as given with descriptions. Field trips are limited to a certain number of participants. Please see the description regarding details and any additional tolls and entrance fees. You may participate in a Saturday morning trip and another Saturday afternoon trip. If registering for more than one person, put the number of people under each field trip choice.

Saturday, All Day	Saturday Morning	Saturday Afternoon	Sunday
1st _____	*1st* _____	*1st* _____	*1st* _____
2nd _____	*2nd* _____	*2nd*_____	*2nd*_____
3rd _____	*3rd* _____	*3rd* _____	*3rd* _____

Mail this form with credit card information or a check payable to VNPS to: VNPS Annual Meeting, 400 Blandy Farm Lane, Unit 2, Boyce, VA 22620. For more information, contact VNPS Office Manager Karen York at 540-837-1600,or info@vnps.org

Want to pay by credit card? Circle one: Discover MasterCard Visa American Express

Card number_____ Expiration date _____ Security Code_____

Print name on card _____ Signature _____

SPEAKERS AND HIGHLIGHTS

Speakers Will Focus on Habitats

Three speakers with years of experience in the Shenandoah Valley's natural world will present programs at the Annual Meeting. On Friday evening, Lynn Cameron, co-chair of Friends of Shenandoah Mountain and long-time board member of numerous outdoor organizations, will explain why Shenandoah Mountain is a special place in the national forest and deserves permanent protection. A retired librarian, Cameron spends most of her time building support for the proposed 90,000-acre Shenandoah Mountain National Scenic Area.

Following Cameron will be Nancy Sorrells, Editor of the VNPS newsletter for almost 20 years, who recently spent many months working to ensure that fracking would be banned from the George Washington National Forest. Even before that matter was settled, the proposed Atlantic Coast Pipeline became an issue in the mountains and valleys of western Virginia. Sorrells will talk about some of the habitats that could be affected by this natural gas pipeline project.

As the keynote speaker Saturday night, retired USDA District Conservationist Bobby Whitescarver will spin some true tales of planting native trees and restoring prairie in a sea of invasives and ignorance. Be prepared to sit back and enjoy his light-hearted humor that will include stories about the apple pie that restored a watershed, a "plantapillar," the gag order on fescue, and the connection between toilet paper and prescribed burns. ❖

Whitescarver

Sorrells

Cameron

RECIPIENTS TO UPDATE ANNUAL MEETING ATTENDEES

Society Awards First Research Grants

The Virginia Native Plant Society has awarded its first two Research Grants, to the Ted R. Bradley Herbarium at George Mason University and the Virginia Master Naturalist Program. Each received $5,000 for work important to the promotion of native plants and botany in Virginia. Recipients will give a brief report at the Annual Meeting.

Alycia Crall, director of the Virginia Master Naturalist Program, and Michelle Prysby, Virginia Master Naturalist program coordinator, received funding toward a project titled "Improving Knowledge of Native Plant Species Distributions in Virginia: A Citizen Science Project for Virginia Master Naturalist Volunteers." They will develop a program with the Virginia Natural Heritage Program for monitoring the distribution of and threats to rare and threatened plant populations in the state, focusing on 30 species.

Andrea Weeks, associate professor of biology and director of the Bradley Herbarium at GMU, received a grant for her project, "Virginia's Virtual Herbarium: Liberating Big Data for Our Native Plants." Her grant supplements funding from the National Science Foundation supporting digital imaging of specimens from 11 Virginia herbaria and the transcription by citizen scientists of information about each specimen. The eventual result will be a public online herbarium of nearly 300,000 specimens.

The VNPS Research Grant Program was begun after the Society received a generous bequest from long-time member Marjorie A. Pitts, of the Potowmack Chapter. The goals are to encourage the study of native plant biology and ecosystems and to advance botany education. This first year of the program is being considered a successful pilot. Participation was strong. Eighteen applications were received, including at least one from every major college or university in the commonwealth and several from conservation organizations.

—Cathy Mayes, Treasurer

Prysby and Crall, left, and Weeks received the first grants.

When It Comes to *Clethra*, Roots Matter

Article and illustrations by W. John Hayden, Botany Chair

Roots, too often, are out of sight and out of mind, but they are critical for vigorous, healthy plant growth. All plant enthusiasts—including gardeners, farmers, foresters, and naturalists—should think about and appreciate roots if they wish to acquire a holistic understanding of plant biology. This article introduces readers to the mycorrhizal roots of the 2015 VNPS Wildflower of the Year, *Clethra alnifolia* (Sweet Pepperbush), and explores the diversity of mycorrhizae in a closely related family, Ericaceae.

Mycorrhizae, literally "fungus roots," are symbiotic associations between microscopic threadlike fungal cells (hyphae) and the superficial tissues of roots. Although structural details vary (Figure 1), mycorrhizae always involve the commingling of fungal and plant cells, allowing the symbionts to exchange vital materials. Most plants, being photosynthetic, produce sugars in leaf tissue; these sugars (and sugar-derived molecules) are transported to the roots, a process essential to keeping root cells alive. But some excess organic compounds exude from root cells and are readily taken up by the fungal partner. The fungus's hyphae permeate the soil, breaking down complex organic matter and absorbing the simpler breakdown products as a fundamental component of their nutritional process; fungal activity also liberates inorganic minerals (like nitrogen and phosphorus, which they also absorb. At the mycorrhizal interface, the fungus secretes excess minerals, which are taken up by the plant. In essence, the plant feeds the fungus and the fungus provides mineral nutrients to the plant. Both partners benefit, hence the symbiosis is mutualistic.

I have not been able to locate any detailed information about the roots of *Clethra alnifolia*, but there is a study of the mycorrhizal roots of a close relative, *Clethra barbinervis*, Japanese Clethra (Kubota et al., 2001). We can assume that the roots of *C. alnifolia* are similar, not only because of the close relationship between the species, but also because the type of mycorrhizae in *C. barbinervis* is, by far, the most common type. *Clethra* possesses arbuscular mycorrhizae (AM), also called endomycorrhizae. These are formed by microscopic glomeromycete fungi whose hyphae enter parenchyma cells of the root cortex and form profusely branched masses resembling small trees (hence, arbuscular). These arbuscule-containing plant cells are where water, nutrients, and organic molecules are exchanged between plant and fungus. Studies in many plants indicate that arbuscules are temporary structures, persisting for a week or two before being resorbed. Thus, arbuscule formation is a more or less continuous process in AM roots. In the roots of *Clethra* and in many other (but not all) AM roots, the fungus also forms bladderlike vesicles that come to occupy most of the cell volume.

Arbuscules have been observed in fossils of some of the oldest known vascular plants, dated at around 400 million years ago. In fact, many believe that the arbuscule type of mycorrhizal association was essential for the successful colonization of terrestrial habitats at about that point in time. It is estimated that 80 percent of vascular plants today have arbuscular mycorrhizae. Interestingly, the fungi of AM are somewhat promiscuous, capable of pairing with diverse plant hosts, and some plant roots may harbor more than one species of AM fungus. Nevertheless, the glomeromycetes are obligate symbionts, incapable of laboratory culture separate from their plant partner. The number of glomeromycete species that form arbuscular mycorrhizae is relatively small. Overall, mycorrhizal roots of *Clethra* are typical, common, and likely to involve several species of these inconspicuous glomeromycete fungi.

Another widespread fungus–root symbiosis is known as ectomycorrhizae. In contrast to AM, ectomycorrhizae involve basidiomycete fungi that mostly form a mantle on the surface of the partner's roots; some hyphae may extend between plant cells near the surface of the root, but they do not penetrate the interior of these cells. These basidiomycetes are mushroom-forming fungi, and their plant partners include conifers like pine and fir, as well as a number of temperate-zone deciduous/eudicot trees such as willow, poplar, beech, birch, and oak. Only about 3 percent of plant species have this type of mycorrhizae. In contrast to AM, ectomycorrhizal associations are species-specific, which explains why the identification of woodland mushrooms is often facilitated by taking note of tree species in their immediate vicinity. The fungal mantle covering ectomycorrhizae causes these roots to be noticeably thick and stubby, sometimes characterized as coralloid.

Clethra is closely related to Ericaceae. Although *Clethra* has common AM, its heath relatives have several different, intriguingly unique forms of mycorrhizae. Most Ericaceae have a type of mycorrhizae reminiscent of AM, at least to the extent that the fungi enter plant cells, but there are

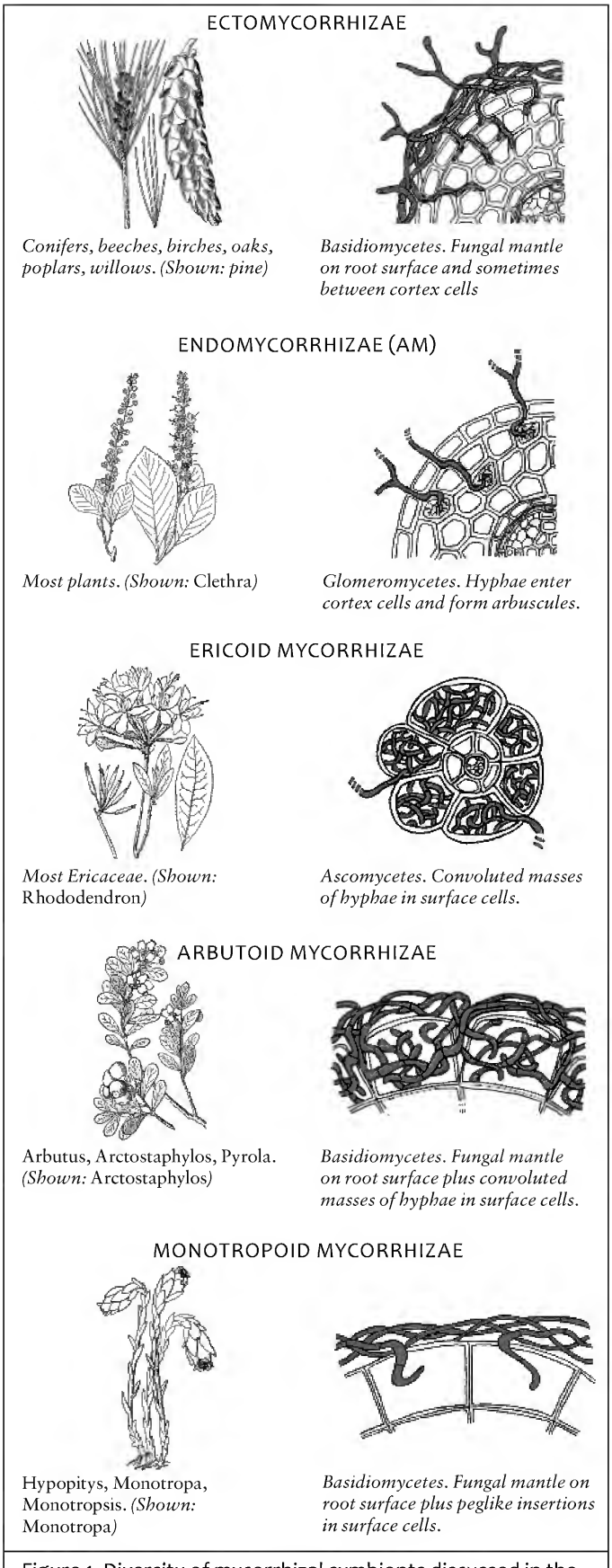

Figure 1. Diversity of mycorrhizal symbionts discussed in the text. Plant illustrations from Britton and Brown's *Illustrated Flora of the Northeastern United States and Canada* (1913). Drawings of mycorrhizae by W. J. Hayden.

manifest differences. Ericaceous roots are notably slender, each consisting of a small central vascular strand, a single ring of small cortex cells, and one layer of large epidermal cells. Roots of most other plants have far more vascular and cortex cells. Also, the fungi involved are ascomycetes (sometimes called cup or sac fungi) and enter only the epidermal cells, where the hyphae form tightly curled, convoluted masses but no arbuscules or vesicles. Cortex cells remain fungus-free. Further, the ascomycete fungi of ericaceous roots are facultatively mycorrhizal—they can also exist as free-living soil microbes and can be grown alone in laboratory cultures. Plants of Ericaceae are well known for their ability to exploit soils so acidic that organic matter decomposes very slowly, resulting in the release of only meager amounts of the mineral nutrients essential for plant growth. Evidently, the special ascomycete fungi of ericaceous mycorrhizae provide these plants with critically needed amounts of nitrogen and phosphorus, allowing them to survive and even dominate peaty, acidic environments.

In addition to the widespread form of ericaceous mycorrhizae described above, this family has at least two other forms, somewhat intermediate between the typical ericaceous mycorrhizae and ectomycorrhizae. *Arbutus* (Strawberry Tree, Madroña), *Arctostaphylos* (Bearberry, Manzanita), and *Pyrola* (Shinleaf) share the so-called arbutoid form of mycorrhizae. As in ectomycorrhizae, there is an external mantle of basidiomycete fungi, but the hyphae that extend into the root grow between epidermal cells and enter some of the surface cells, where they form tightly coiled masses of hyphae. The tightly coiled hyphae of arbutoid mycorrhizae resemble the ericaceous type, despite being formed by a fungus of a different phylum.

The other form of mycorrhizae found in the heath family is restricted to a group of genera that have given up quintessential features of plant life: they have no chlorophyll, cannot photosynthesize, and, hence, are heterotrophic, not autotrophic. As distinguished in the *Flora of Virginia*, our local representatives of this odd group include *Hypopitys, Monotropa,* and *Monotropsis* (pinesaps and Indian pipes). These plants were once considered saprophytes, implying that they obtained their nutrition directly from the decomposition of organic matter in the soil. The true story became clear with the discovery that roots of these plants are sheathed with a mantle of basidiomycete fungi. As with arbutoid mycorrhizae, the fungus also enters surface cells, but penetration is restricted to a simple peglike hypha. Another distinction is that the fungi involved in these monotropoid mycorrhizae also form typical ectomycorrhizae with nearby coniferous trees. The fungus and conifer share the usual symbiotic relationship

described earlier. But since Indian pipes and pinesap plants lack chlorophyll and so make no sugar of their own, it is hard to imagine what these plants provide to the fungus. The inescapable conclusion, now backed by experimental evidence, is that they obtain all their minerals and organic molecules from their fungal partners, giving back nothing in return. The plant parasitizes the fungus and, to some extent, steals from the conifer via the intermediate fungus. The term describing the unusual mode of existence exploited by Indian pipes and pinesaps is mycoheterotrophy.

If the basic idea of mycoheterotrophy is enough to make your head spin, consider that, while not exactly common, this mode of plant–fungus interaction crops up, here and there, across the breadth and depth of the plant kingdom. Examples are known from a few liverworts, some lycophytes (clubmosses), and a few ferns (all of them from haploid gametophyte generations); further, among flowering plants we also have two eudicot and eight monocot families, including, famously, *Corallorhiza* (coral root) and other orchids. But none of these other mycoheterotrophs are particularly closely related to *Clethra*.

Clearly, Ericaceae have been a hotbed of mycorrhizal diversification characterized by extremely fine-textured roots inhabited by ascomycete and some basidiomycete fungi that are otherwise not known to associate with higher plants. But one of their closest relatives, *Clethra*, conforms to the most common, prosaic form of mycorrhizal association, AM. How could an apparently ancient and eminently successful mutualistic relationship (exemplified in *Clethra*) have been abruptly replaced by different fungi in the fine-textured roots of ericaceous plants? I don't have an answer! This is a mystery. But I do have a small suggestion. Someone needs to examine the roots of *Cyrilla* (Ti-ti, Cyrillaceae), because this genus is also closely related to Ericaceae, and the mycorrhizal status of its roots, as far as I can tell, is also unknown. Will *Cyrilla* have ordinary AM, or one of the specialized types found in Ericaceae, or some intriguing intermediate? Might *Cyrilla* provide insight into what drove the shift from AM to the much less common forms of mycorrhizae found in Ericaceae?

Certainly there are lessons to be learned by looking under the surface of things. Roots matter. It is, indeed, important to remember roots! ❖

The literature on mycorrhizae and similar fungus–plant mutualisms is vast. These sources were useful in composing this article:

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